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Exploring the Effect of an Interdisciplinary Teamwork Intervention
in Acute Rehabilitation

Julie K. Cope

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of
Master of Science

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ABSTRACT

Exploring the Effect of an Interdisciplinary Teamwork Intervention in Acute Rehabilitation

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Purpose: The purpose of this study was to explore the efficacy of an interdisciplinary intervention on interdisciplinary teamwork and patient functional outcomes in an acute inpatient rehabilitation unit at a mid-sized regional hospital.

Design: Pilot mixed-methods pre-post intervention study.

Methods: Interdisciplinary teamwork and patient functional outcomes were measured before and after a teamwork intervention. Interdisciplinary teamwork was measured with the Healthcare Team Vitality Instrument (HTVI) and a qualitative staff questionnaire developed by a content expert. Patient functional outcomes were measured by aggregated Functional Independence Measure (FIM®) scores.

Findings: Post-intervention FIM® gain scores increased significantly ($p = .008$). Staff questionnaire revealed improvement in interdisciplinary teamwork, with the major themes of teamwork and appreciation/respect. Post-intervention HTVI showed no significant change ($p = .528$).

Conclusions: Initial results of this intervention are promising; additional research is needed to study the effectiveness of this intervention in a variety of acute rehabilitation settings.

Clinical Relevance: Rehabilitation leaders can implement low-cost teamwork interventions to improve interdisciplinary teamwork and patient outcomes.

Keywords: interdisciplinary communication, interprofessional relations, patient care team, rehabilitation centers, stroke, nervous system diseases

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Exploring the Effect of an Interdisciplinary Teamwork Intervention in Acute Rehabilitation

Acute rehabilitation (AR) departments are complex environments where many different disciplines work together to provide care. In addition to being complex, these environments are sometimes challenging due to high patient acuity, significant staff workload, and inadequate teamwork. Studies show these factors can negatively impact patient outcomes (Miller & Kontos, 2013). Additional variables that contribute to inadequate interdisciplinary teamwork include staff vacancies or absences, poorly structured team meetings, inadequate documentation without formal measurement tools, and ineffective leadership (Tyson, Burton, & McGovern, 2014). While some factors are unavoidable, because of their interdisciplinary nature AR departments are uniquely positioned to address teamwork deficiencies.

To improve teamwork, it is important to understand the ideal AR team. Many qualitative studies have identified attributes of well-functioning rehabilitation teams. Clarke (2010) documented the following four characteristics of highly functional stroke teams: (a) Optimism about stroke care, (b) a holistic view of patient rehabilitation, (c) openness to learning and working together, and (d) an inclusive culture. Additionally, Karol (2014) identified four additional characteristics that promote interdisciplinary teamwork, including (a) consistent staffing of well-trained team members, (b) dynamic dialogue at routine team conferences, (c) physical proximity of staff members, and (d) leadership focused on teamwork. Lastly, an additional study reported that when clinicians were trained together they had better team communication and focused on patient goals (Jones et al., 2012). These observational studies documented factors correlated with high team functioning at various AR departments, but did not establish causation.

The relationship between improved interdisciplinary teamwork and patient outcomes was explored in a landmark study by Kilbride, Perry, Flatley, Turner, and Meyer (2011). This case study described the process of developing an effective stroke team and its effect on patient outcomes. The authors began with a fragmented stroke delivery team that produced patient functional outcomes in the bottom five percent of all rehabilitation departments in England. Over four years the department leaders created an outstanding department that achieved the highest patient functional outcomes in the region. Elements of their transformative plan included promoting opportunities for working together, clarifying role expectations, providing training on stroke care, multidisciplinary charting, recognizing the nurse as the team coordinator, and raising stroke awareness in the community. Although this study provided important foundational knowledge on specific interdisciplinary interventions at an AR department, additional research is needed to assess the impact of interventions on patient outcomes.

The purpose of this pilot study was to measure the effect of a teamwork intervention on interdisciplinary teamwork and patient functional independence in an AR department. This study focused on patient functional outcomes, specifically mobility and self-care, in accordance with the Rehabilitation Nursing Research Agenda, item 3.2, "Individuals' functional outcomes in relation to the type, intensity, and duration of rehabilitation nursing services received" (Lehman, et al. 2014, para. 3).

Methods

Setting/Sample

This pre-post intervention descriptive mixed methods pilot study was conducted with a convenience sample of interdisciplinary team members from an inpatient AR department at a mid-sized regional hospital located in the western United States. Patients in this department were

recovering from stroke, spinal cord injury, and other neuromuscular disorders. The AR department had 34 front line employees.

Variables

The independent variable for this study was the teamwork intervention. The dependent variables were interdisciplinary teamwork and patient functional independence.

Intervention

The executive team of the AR department designed a teamwork intervention with the following components in mind: (a) interprofessional collaboration, (b) interdisciplinary cross training for all staff on a standard set of patient mobility skills, and (c) emphasis on patient safety. The executive team included the Nursing Department Manager, Physical Therapy Manager, Occupational Therapy Manager, and Medical Director.

Elements of the teamwork intervention are outlined in Table 1. These elements include decreased barriers for nurse participation in team conference with the creation of a nurse care manager role that spanned across the continuum of sporadic twelve-hour shifts. Additionally, interdisciplinary skills pass-off was created, with all employees demonstrating proficiency on patient transfers, ambulation, positioning in bed, positioning at meal times, and use of lift equipment. Staff accomplishments were celebrated with recognition in staff meeting; gift cards and movie tickets; and positive notes from fellow staff members and the manager. Patient case conference was revised so that it included only persons directly caring for the patient, as opposed to including team members who were not involved with patient care. Similarly, the individual cases in case conference were presented by the nurse caring for the patient, as opposed to other members of the interdisciplinary team. Because the primary caregiver was responsible for

presenting each patient case at case conference, it facilitated a fuller understanding of the patient condition.

Outcome Measures

Outcome measures were assessed at baseline and at follow-up one year later. The two outcomes measured were interdisciplinary teamwork and patient functional outcomes.

Interdisciplinary teamwork was measured with the Healthcare Team Vitality Instrument (HTVI) and a qualitative role perceptions questionnaire. Patient functional outcomes were measured with the Functional Independence Measure (FIM®).

Healthcare Team Vitality Instrument (HTVI). This instrument is a quantitative 10-item questionnaire measuring changes in team function using a self-reported 1-5 Likert-type scale (1= *strongly disagree*; 3 = *neutral*; 5 = *strongly agree*) (Upenieks, Lee, Flanagan & Doebbeling, 2010). Questions on the HTVI include, “Care professionals communicate complete patient information during hand-offs,” “Care team members on this unit feel free to question the decisions or actions of those with more authority,” and “If I have an idea about how to make things better on this unit, the manager and other staff are willing to try it.” The HTVI has been validated using several methods by Upenieks et al. (2010) (<http://www.ihl.org/resources/Pages/Tools/HealthcareTeamVitalityInstrument.aspx>).

Qualitative Role Perceptions Questionnaire. This instrument was created by the authors and validated based upon expert opinion and review the literature. Staff wrote responses to seven open-ended questions. One of the qualitative questions, “What one thing would you want other disciplines to know about your discipline?” is reported in this paper. See Figure 1.

Patient functional outcomes. This outcome was measured using the quantitative Functional Independence Measure (FIM®), a tool utilized by clinicians to monitor the functional

recovery of patients. Scores range from 18 to 126, and higher scores reflect higher patient function. FIM® scores were calculated by rehabilitation staff upon admission and upon discharge using a standard scoring system (Uniform Data System for Medical Rehabilitation, 2012). Previous research reported that the FIM® is more sensitive than other standardized tools in measuring functional status in persons recovering from stroke (chi-squared comparison test $\chi^2 = 9.33, p < 0.001$) and without any ceiling effect (Dromerick, Edwards, & Diringer, 2003). Additionally, the Center for Medicare and Medicaid Services requires that acute inpatient rehabilitation facilities complete the FIM® as part of a comprehensive assessment on each patient at admission and discharge (Centers for Medicaid and Medicare Services, 2009).

Data Collection Procedures

Institutional review board approvals were obtained prior to data collection. Following informed consent, a convenience sample of 34 frontline interdisciplinary staff from an acute inpatient rehabilitation department were approached during a routine staff meeting to complete pre-intervention questionnaires (HTVI, role perceptions and demographics) during the 3rd quarter 2013. Monthly department FIM® gain was also collected for the twelve months prior to the pre-intervention data (August 2012-July 2013). After the pre-intervention questionnaire was completed, a teamwork intervention was implemented over a twelve-month period. While the questionnaire was voluntary, all staff members were required to participate in the teamwork interventions as a condition of employment. Post-intervention data was collection during the 4th quarter of 2014 in the same manner as pre-intervention with the monthly FIM® gain data collected between January 2014-December 2014.

Data Management and Analytic Methods

Healthcare Team Vitality Index. Pre-intervention and post-intervention HTVI scores for each staff member were calculated by summing the score from each question, then dividing by the number of questions (10). Descriptive statistics (mean, SD, skew, median, kurtosis) were calculated using IBM SPSS version 22.0 (IBM Inc, Chicago IL). Because the data were not normally distributed (negatively skewed), scores were adjusted using reflection and then normalized using a Log10 transformation. The difference in overall HTVI mean scores before and after the intervention was calculated using an independent t-test. An independent t-test was used because while the respondents were in the same department, the data was not matched by respondent. A one-way Analysis of Variance was also conducted to determine if there was a significant difference in mean responses by job category (nursing vs. therapist) pre and post intervention. The reliability of the HTVI scale for this study was calculated using a Cronbach's alpha coefficient.

Role perceptions questionnaire qualitative content analysis. A content analysis was done of the narrative responses. Responses were typed verbatim into a word processing program. Prior to analysis, all responses were stripped of identifying data. Data were separated into pre-post comments. Because of the small number of respondents, narrative responses from providers of different disciplines were pooled. The lead author and 1st co-author independently coded the data using a thematic analysis. The researchers then compared their coding and resolved discrepancies. A second round of coding was performed by the 2nd co-author. Trustworthiness of the data was established through repeated verification of the coding by the lead author and 1st co-author (Miles, Huberman, and Saldana, 2014, Chapter 4).

Patient functional outcomes. The FIM® scores were calculated by the AR department staff upon admission and at discharge. The FIM® gain was calculated for each patient (FIM® at discharge minus FIM® at admission). Individual patient FIM® gain scores were usually positive, reflecting improved function as a result of therapeutic intervention. Rarely, a patient would have a negative FIM® gain score if deterioration in a medical condition caused decline in functioning. Individual patient FIM® gain scores were aggregated to the department level every month and averaged to produce the average monthly department FIM® gain score. The authors utilized descriptive statistics (mean, SD, skew, kurtosis) to analyze the data. The pre-post intervention difference in mean FIM® gain and LOS were calculated using an independent t-test.

Results

Sample

Out of a total of 34 front-line staff members, 20 staff members completed the pre-intervention questionnaire (59% response rate), and 23 staff members completed the post intervention questionnaire (68% response rate). The average respondent was a female nurse under the age of 45 with 5-7 years of experience. All participation and demographics are summarized in Table 2.

Interdisciplinary Teamwork

HTVI instrument. The mean pre-intervention HTVI scores were 4.22 compared to 4.32 for the post intervention scores (Table 3). Cronbach's alpha coefficient for the HTVI in this study population was .842. After normalizing the data, the independent t-test results showed that there was no statistically significant difference between the overall HTVI pre and post intervention, or HTVI scores by job category ($p < .05$).

Role perceptions questionnaire. Several themes emerged from the open-ended qualitative questions from the pre-post intervention data (Figure 1). The three themes that emerged from the pre-intervention questionnaire were a) need for teamwork, b) need to improve communication, and c) need help with tasks. The two themes that emerged from the post-intervention questionnaire were a) effective teamwork and b) respect/appreciation for team members. The shift in themes from pre-intervention to post-intervention demonstrated a dramatic improvement in interdisciplinary teamwork (Figure 2).

Pre-intervention. Prior to the intervention, staff shared multiple changes that were needed to improve interdisciplinary teamwork.

Need for teamwork. Comments in this theme centered around the need to share expert knowledge on task performance. Comments clearly demonstrate that if expert knowledge from the various disciplines were shared, the needed tasks could be performed more effectively. Typical statements included “I want you to teach me how to move patients correctly so no one gets hurt,” and “We don’t know everything about what you do- we need teaching sometimes.”

Need to improve communication. This theme included respect for perspectives and open communication regarding concerns. Comments representing these themes included, “Listen to me and take me seriously when I communicate my concerns to you about a patient,” and “Be willing to talk to me about your concerns with the patients you care for.”

Need help with tasks. Comments in these theme identified specific tasks where team member assistance would be helpful and decrease workload. Statements included, “We need help getting patients to and from meals,” and “Take more initiative with all patients etc. lights.”

Post-intervention. After the intervention, comments were overwhelmingly positive regarding how the team was working together.

Effective teamwork. This theme included comments about understanding each other's roles and that they were a team in helping and sharing responsibilities. Typical statements included, "Overall good communication and understanding of role," and "We are so willing to help with everything we are a team day/night."

Respect/appreciation for team members. Comments in this theme clearly demonstrate the respect and appreciation that each discipline brought to the team and how it improved the ability to care for patients. Comments included, "Nurses respect the SW [social workers] in so many ways," and "Your training is different than my training as a nurse and we think differently but so glad the patient has each discipline working in their specialty for their behalf." See Table 4.

Patient Functional Outcomes

FIM® gain score. The average FIM® gain score for the pre-intervention period was 34.88 to 39.21 post intervention. Independent t-test results indicate a statistically significant increase in the FIM® gain post-intervention ($p = .008$). The average patient pre-intervention LOS was 12.5 days, with a post intervention LOS of 13.5 days ($p=.213$). Results are summarized in Table 3.

Discussion

The main finding of this study is that an interdisciplinary teamwork intervention created an improvement in both interdisciplinary teamwork and patient functional outcomes. The qualitative data described improvement in interdisciplinary teamwork as measured by content analysis of staff narrative responses. Patient functional outcomes data demonstrated a statistically

significant increase in FIM gain scores, representing a larger functional improvement over the patients' course of acute rehabilitation therapy. This was accompanied by a non-statistically significant increase in LOS.

While similar results have been found in other populations such as nursing homes, outpatient psychiatric services, and a variety of other settings (Fortney et al., 2015; Marino et al., 2015; Nazir et al., 2013; Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013), this is relatively new information for acute rehabilitation. The clinical significance of this finding is substantial, because even small improvements in patient functional outcomes translate to both improved quality of life and improved reportable patient outcomes.

Interdisciplinary Teamwork

In this study, the first outcome measure of interdisciplinary teamwork did not show a quantitative improvement through the HTVI. Due to the newness of this instrument, limited results are available to compare the findings of this study with other studies. However, Collet et al. (2014) published a study protocol that includes use of the HTVI to track staff changes in response to quality improvement interventions, but results have not yet been released.

Staff in this study described a change in their role perceptions related to interdisciplinary teamwork. The qualitative questionnaire revealed an improvement in response to a teamwork intervention, and these findings are similar to several other authors (Gustafsson, Fleming, Cornwell, Worrall, & Brauer, 2014; Jones et al. 2012; Vanderzalm, Hall, McFarlane, Rutherford, & Patterson, 2013). The clinical significance of this finding is notable, because many acute rehabilitation departments seek low-cost, management-directed interventions to improve interdisciplinary teamwork.

Patient Functional Outcomes

The FIM® gain score demonstrated a statistically significant improvement in patient functional independence. It is possible that the increase in FIM® gain is related to a non-statistically significant post intervention increase in average LOS, from 12.48 to 13.53 days. A recent study by Camicia, Wang, DiVita, Mix, and Niewczyk (2016) revealed LOS had a variable effect on FIM® gain, depending on patient functional status at time of admission. In this study, it is also possible that the FIM® gain increase in conjunction with an increase LOS occurred because patients with improved functional recovery sometimes receive insurance authorization for additional days of acute rehabilitation. Lastly, increase in LOS may have been due to the inherent variation in patient acuity and recovery, as the change in LOS did not achieve statistical significance ($p=.213$). Additional studies are needed to elucidate the relationship between implementation of a teamwork intervention, improved FIM® gain, and changes in LOS.

A review of the literature shows many authors have used FIM® gain to measure improvements in patient functional independence in AR departments (Hua, Camicia, DiVita, Mix, and Niewczyk, 2015; Scrutinio et al., 2015). Other authors have identified multiple organizational factors that improve FIM® outcomes, including rehabilitation interventions tailored to patient deficits, co-located acute/rehabilitation stroke care, length of stay, reimbursement structure, and hours of therapy per day (Chan et al., 2014; Cullen, Vimalasan, & Taggart, 2013; Mizrahi, Fleissig, Arad, & Adunsky, 2015; Qu, Shewchuk, Chen, & Richards, 2010). Like previous authors concluded, the mixed-methods study described in this article concluded that changing organizational factors, specifically interdisciplinary teamwork, improved FIM® outcomes.

The findings from this study are important because little research exists that assesses the impact of teamwork interventions on patient outcomes in AR departments. The authors of this study selected a mixed-methods approach to secure the deductive reasoning assurance of numerical analysis, along with the inductive reasoning context of the participants' own words (Wheeldon & Ahlberg, 2012). While the quantitative data exploring teamwork did not produce statistically significant results, the qualitative data supported a narrative of positive change in response to the intervention along with improved patient outcomes as measured by the FIM® gain scores.

This information could be useful to leaders at AR departments who are searching for interventions to improve both interdisciplinary teamwork and FIM® gain scores. In an era of decreasing reimbursement, AR departments can use these results to implement interventions that improve both interdisciplinary teamwork and patient functional outcomes with minimal cost.

Limitations

As a pilot study, this project has shortcomings that can be corrected in future studies. One limitation is that a small convenience sample was used. Additionally, the average response to the HTVI questionnaires was between 4.2 and 4.3 on a five-point scale, which suggests lack of sensitivity in measuring change. Scores clustered at the high end of this scale indicate a ceiling effect, and an instrument completed by few participants may not capture a significant change in interdisciplinary teamwork. Future studies using random sampling of rehabilitation departments with a larger sample size and matched control departments may alleviate or minimize the limitations.

Conclusions

The results of this pilot study show that a teamwork intervention at an inpatient acute rehabilitation department improves outcomes. The qualitative instrument found a positive post-intervention shift in interdisciplinary teamwork including increased teamwork and respect for various members of the team. Patient functional outcomes showed statistically significant improvements. Additional rigorous quantitative research designs are needed to determine the effectiveness of this intervention in a variety of acute rehabilitation settings.

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Table 1

Teamwork Intervention

Initial Teamwork Intervention	
Monthly single-point lessons for improving patient functional independence	Interdisciplinary orientation with cross-training for newly-hired staff
Newsletters	Suggestion box
Celebration of staff accomplishments	Interdisciplinary skills pass-off
Interventions added over 12-month intervention based on staff feedback	
Revising the method of patient conference presentation	Decreasing barriers for nurse participation in team conference
Clarifying the nurse case manager role	

Table 2

Participation and Demographics

	Pre-Intervention	Post Intervention
Staff completing questionnaire	20	23
Response Rate	59%	68%
Female	76%	85%
Registered Nurse	50%	51%
Nurse's Aide	23%	14%
PT/OT	23%	28%
Age range 36-45	40%	30%
Average years of acute rehabilitation experience	5.9	7.3

Table 3

Interdisciplinary Teamwork and Patient Functional Independence (Pre and Post Intervention)

	Pre-intervention		Post-Intervention		Independent t-test
	Mean (SD)	Skewness/Kurtosis	Mean (SD)	Skewness/Kurtosis	T-value/P-value
<i>Healthcare Team Vitality Instrument</i>	4.22 (0.504)	0.372/-1.4	4.32 (0.54)	-0.553/-0.339	0.637/.528
<i>FIM® Gain</i>	34.88 (2.8)	-0.129/-1.1	39.21(4.3)	0.308/-0.855	-2.91/.008
<i>LOS</i>	12.48 (2.18)	.482/-.540	13.53 (1.79)	.763/-.856	-1.282/ .213

Note. SD = Standard deviation. Healthcare Team Vitality Instrument utilized a 1-5 Likert Scale. FIM® Gain = Average FIM® at discharge minus Average FIM® at admission. LOS= Average length of stay. Pre-intervention period is August 2012-July 2013. Post-intervention period is January 2014-December 2014.

Table 4

Role Perceptions: Pre- and Post-Intervention Themes

	Theme	Examples
Pre-Intervention	Need for Teamwork	<p>“I want you to teach me how to move patients correctly so no one gets hurt.”</p> <p>“We don’t know everything about what you do- we need teaching sometimes.”</p>
	Need to Improve Communication	<p>“Listen to me and take me seriously when I communicate my concerns to you about a patient.”</p> <p>“Be willing to talk to me about your concerns with the patients you care for.”</p>
	Need Help with Tasks	<p>“We need help getting patients to and from meals.”</p> <p>“Take more initiative with all patients etc. lights.”</p>
Post-Intervention	Effective Teamwork	<p>“Overall good communication and understanding of role.”</p> <p>“We are so willing to help with everything we are a team day/night.”</p>
	Respect/Appreciation for Team Members	<p>“Nurses respect the SW [social workers] in so many ways.”</p> <p>“Your training is different than my training as a nurse and we think differently but so glad the patient has each discipline working in their specialty for their behalf.”</p>

Note. Participants were asked, “What would you want this discipline to know about your discipline?”

Figure 1

Role Perceptions Staff Questionnaire

1. What one thing would you want other disciplines to know about your discipline? (example: if I am nurse, what do I want physical therapy to know about nursing)

	What would you want this discipline to know about your discipline?
A. Nursing	
B. Physical therapy	
C. Occupational therapy	
D. Social Work	
E. Dietician	
F. Physicians	
G. Nurse Practitioners	
H. Aides/Techs	
I. Speech Language Pathology	
J. Other	

Figure 2

Qualitative Staff Questionnaire: Major themes from pre- and post-intervention

